Abstract:

The combination of scaffolding materials and stem cell technologies is widely used in tissue regeneration. Concentrated Growth Factor (CGF) is an autologous and biocompatible product derived from blood, rich in growth factors and able to stimulate the osteogenic differentiation of bone marrow stem cells. It contains, also, multipotent stem cells, found capable to differentiate into osteoblasts when stimulated. In this study, we explored the use of CGF together with a hydroxyapatite and silicon (HA-Si) scaffold, a material of great interest for bone reconstructive surgery. The aim was to assess the ability of HA-Si scaffolds to induce osteogenic differentiation in CGF primary cells. We evaluated the viability of CGF primary cells on HA-Si scaffolds using MTT assay and conducted structural characterization through SEM analysis. Matrix mineralization was assessed using Alizarin red staining. The expression of osteogenic differentiation markers was measured through mRNA quantification by real-time PCR. Our findings revealed that HA-Si scaffolds are non-cytotoxic for CGF primary cells, supporting their growth and proliferation. Additionally, the HA-Si scaffold promotes the expression of osteogenic markers, reduces the levels of stemness markers, and facilitates mineralized matrix formation. In conclusion, HA-Si scaffolds appear to be a promising biomaterial support for CGF in tissue regeneration applications.